SECTION 7
CONCLUSIONS

7.1 OVERVIEW

During the course of the MA-26 mission area analysis (MAA), 73 major tasks were validated. A comparative analysis of tasks to current and projected capabilities was conducted to identify deficiencies that either impair or prevent task accomplishment as well as opportunities, that if exploited, could enhance current capabilities. Once identified, these deficiencies and opportunities were assessed to determine their validity. The recommendations associated with the validated deficiencies were evaluated for completeness. Priorities were assigned to each deficiency signifying the degree of importance. This assessment resulted in 22 validated deficiencies with associated recommendations and 3 opportunities (see Table 7-1).

Table 7-1. Prioritized MA-26 Deficiencies With Associated Recommendations and Opportunities

Deficiency by Priority	Recommendation
1. The MAGTF has an inadequate capability to perform forcible entry against a coastal barrier defense.	**Doctrine:** (1) Expedite the process of examining and refining MCM concepts, doctrine, and tactics. (2) Complete the Fleet Marine Force Operational Handbook OH 1-17, *Amphibious Operations in a Mine Environment.* **Training/Education:** (1) Increase realistic MCM training. (2) Incorporate MCM functions from deep water, through the shallow water zones and across the beach to the objective in Joint Navy/Marine exercises. (3) Utilize the capabilities of existing national, theater, and tactical sensor systems to support MCM functions and familiarize dissemination channels. **Equipment:** (1) Support Shallow Water MCM (SWMCM) efforts in technological development. (2) Develop an "across-the-beach" breaching capability for forces moving from the surf zone through to egress routes from the beach. (3) Develop or refine the capability to clandestinely detect and locate anti-landing barriers. **Support/Facilities:** Identify and obtain appropriate training areas in which to conduct realistic MCM training.
2. The MAGTF has an inadequate capability to detect, breach, reduce, clear, record, and mark minefields and other obstacles.	**Training/Education:** Implement realistic MAGTF counterobstacle training in wargaming and training exercises. **Equipment:** (1) Develop and field a remotely operated, ground-based, vehicle mounted minefield detection system. (2) Participate in joint land countermine programs with the Army. (3) Research and develop an integrated system of fully capable detection, breaching, clearing, and marking sub-systems. (4) Develop and field a mechanical breaching system capable of maneuvering with the ground maneuver element. (5) Develop and field improved explosive breaching systems. (6) Continue the development and fielding of systems to rapidly defeat light obstacles and anti-personnel mines from standoff, such as APOBS. (7) Develop and field a standoff obstacle reconnaissance capability. (8) Explore and exploit advance breaching technologies that would enhance MAGTF mobility.

Table 7-1. Prioritized MA-26 Deficiencies With Associated Recommendations and Opportunities

Deficiency by Priority	Recommendation
3. Engineers have an inadequate capability to maneuver with ground forces.	**Organization**: Develop a similar organization within amphibious assault battalion when the AAAV is purchased to provide engineer mobility. **Equipment**: (1) Develop and field a combat engineer vehicle with armored protection, capable of transporting engineers and their equipment with sufficient mobility to maintain pace with the other elements of the MAGTF's maneuver force. (2) Review MAGTF T/Es with emphasis on ground tactical mobility requirements; specifically, CEB transport capacity for heavy equipment and palletized material. (3) Continue to evaluate the Combat Breacher Vehicle (CBV) for Marine specific requirements and possible procurement. (4) Develop an Engineering variant of the AAAV.
4. The MAGTF's capability to cross a wet/dry gap is seriously deficient.	**Training/Education:** Increase the amount of realistic gap crossing operations in tactical exercises. Incorporate Naval Construction Forces (NCF) into this training. **Equipment:** Procure lightweight, mobile, assault bridging that can be quickly emplaced without the aid of heavy equipment.
5. The MAGTF's capability to construct/repair forward airfields and landing zones is deficient.	**Doctrine:** (1) Develop doctrine that delineates the step by step process and requirements for RRR. Examine the feasibility of incorporating NCF RRR procedures. (2) Develop doctrine regarding airfield recovery (i.e., organizing a disaster control center, task organizing bomb/damage survey teams, developing communications plans, executing bomb/damage assessments and restoring the airfield). **Training/Education:** (1) The Marine Corps Engineer School should develop the academic instruction to adequately prepare engineer officers and enlisted personnel to perform the RRR mission. **Equipment:** (1) The proper mix of MAGTF engineer/NCF equipment/material to conduct construction/repair of runways should be included both aboard MPS and as part of the Fly-in echelon (FIE) in Maritime Preposition Force operations. (2) Forward basing sites should be selected to stage AM2 matting. (3) Continue to support the EAF 2000 initiative being included in the MPF(E) program. (4) A Research, Development, Test, and Evaluation (RDT&E) program is necessary to support the requirement of development of a new light weight expeditionary aircraft landing mat.
6. The MAGTF has an inadequate capability to transport, distribute and store fuel.	**Doctrine**: Conduct an analysis regarding the future MAGTF fuel requirements in support of concepts such as OMFTS. **Equipment:** (1) Conduct a configuration analysis of tactical fuel systems. (2) Develop and field a system to improve fuels distribution, such as the assault hoseline system. (3) Determine the number of rapid refueling kits needed to support the MAGTF and initiate procurement action. (4) Conduct a survey of international fuel fittings and initiate procurement action to create a kit consisting of a series of universal adapters. (5) Explore advanced petroleum distribution/transportation technologies.
7. The MAGTF has an inadequate capability to produce, store, and distribute water.	**Equipment:** (1) Develop a water transport module with integral pump that is a single tank that conforms to the configuration of a single layer, three SIXCON module set. (2) Complete the fielding of the TWDS system. (3) Develop and field larger water storage containers in the ESBs and MWSSs. (4) Develop and field a system that improves the MAGTF's capability to locally distribute water. (5) Continue to develop and field the Enhanced Reverse Osmosis Water Purification Unit (EROWPU). (6) Explore and exploit advanced water distribution technologies.
8. The MAGTF lacks adequate transportation assets to transport engineer equipment.	**Doctrine**: Conduct a study into the line-haul transportation requirements of the MAGTF. Included in this should be the identification of those heavy assets requiring transportation. This should also establish the percentage of assets expected to be transported by the organic assets of the individual unit. **Equipment**: Procure the appropriate mix of line-haul transportation assets.
9. The MAGTF's capability to provide countermobility support is deficient.	**Doctrine:** Update Marine Corps doctrine on countermobility operations. **Training/Education:** Include and increase realistic countermobility training in exercises. **Equipment:** Develop and procure rapid minelaying systems. **Support/Facilities**: Identify and obtain appropriate training areas in which to conduct realistic countermobility training.

Table 7-1. Prioritized MA-26 Deficiencies With Associated Recommendations and Opportunities

Deficiency by Priority	Recommendation
10. The MAGTF's capability to perform vertical and horizontal construction is deficient.	**Organization:** Conduct a detailed study to determine the proper operator/equipment ratio for optimal employment of engineer equipment within the MAGTF. Adjust both personnel strengths and equipment densities accordingly. **Training/Education:** (1) Include training on the ABFC system in the POIs of company grade officers and SNCOs at the Marine Corps Engineer School. (2) Provide training opportunities with K-span technology structures for the operating forces. **Equipment:** (1) Field replacements for the aging fleet of horizontal construction equipment. (2) Conduct a study into the optimal earthmoving requirements of the MAGTF. Procure appropriate numbers and types of equipment to meet these requirements. (3) Ensure that adequate amounts of Class IV materials are available in the force structure for both training and operations. (4) Coordinate with the Navy Civil Engineer Support Office (CESO) to update the ABFC to meet MAGTF expeditionary requirements. (5) Develop and field a water distribution system for horizontal construction requirements. (6) Explore and pursue advanced, lightweight, quickly erected construction technologies. (7) Procure an improved soil testing capability that can provide all aspects of soil characteristics, particularly to measure CBR. (8) Develop and procure advanced technology equipment for engineering.
11. The MAGTF has an inadequate capability to provide Forward Arming and Refueling Point (FARP) support.	**Equipment:** (1) Procure a multipoint rapid refueling kit. (2) Need to develop a capability to reduce refueling time for aircraft at FARP sites. (3) Conduct a configuration analysis of the FARP fuel requirements. (4) Research and develop systems that reduce the refueling time required for aircraft at FARP sites.
12. The MAGTF's capability to effectively plan and supervise/coordinate its engineer assets, including those of host nations and assigned Naval Construction Forces is inadequate.	**Doctrine:** Modify the appropriate doctrinal publications to establish the MAGTF's engineer officer as a separate staff officer, with direct liaison for reporting to the Chief of Staff. **Organization:** (1) Establish the MAGTF's engineer section as a special staff section. (2) Emphasize the proper assignment and utilization of engineer personnel within the MAGTF staffs. **Training/Education:** (1) Educate officers at all levels on the force multiplying capabilities of the engineer organizations at his disposal. (2) Include in the appropriate POIs, instruction for both engineer officers and senior SNCOs in high level staff operations and the staff planning process. (3) Develop MCI extension courses that provide education into the engineer specific issues involved in the staff planning process. (4) Incorporate realistic engineering support requirements into MAGTF training exercises to train staff engineers.
13. The MAGTF has insufficient Container Handling Equipment (CHE).	**Doctrine:** Develop policy to address container throughput from ship to forward areas. **Equipment:** (1) Determine the appropriate numbers and mix of differently configured RTCHs available on MPF ships to provide adequate container handlers for loading/offloading . (2) Enhance CHE for 20 and 40 foot container handling and offload capability through product improvement/technological advancements.
14. The MAGTF's maintenance of engineer equipment is inadequate.	**Doctrine:** (1) Publish a current edition of MCO 5320, *Personnel Requirements Manual*, once detailed mechanic requirements are updated. (2) Review maintenance procedures for engineer equipment to adopt automated diagnostic technologies. **Organization:** Conduct a detailed study to determine the proper mechanic/equipment ratio for optimal maintenance of engineer equipment within the MAGTF. **Training/Education:** Improve maintenance personnel troubleshooting skills by increasing the amount of exposure to the many types of engineer equipment during fleet training. **Equipment:** (1) Incorporate automated diagnostic capabilities in engineer equipment. (2) Seek commonallity between engineer equipment types during the procurement process. (3) Field replacements for the aging fleet of engineer equipment.

Table 7-1. Prioritized MA-26 Deficiencies With Associated Recommendations and Opportunities

Deficiency by Priority	Recommendation
15. The MAGTF's capability to construct/repair defensive field fortifications in an expedient manner is inadequate.	**Equipment:** (1) Develop and field engineering equipment that provides for the expedient construction of fighting and protective positions, with the requisite battlefield mobility for the conduct of maneuver warfare. (2) Assign a higher priority to embarkation of construction material in the Assault Follow-on Echelon (AFOE) embarked on the Ready Reserve Fleet (RRF). (3) Recommend to CINCs and services to forward base construction material to lessen the embarkation burden and shorten distances required to transport this material. (4) Procure prefabricated shelters, shelter components, and materials that provide ballistic protection from direct small arms, and indirect artillery and rocket fire. (5) Develop and field a system that expedites the filling of sandbags for expedient field fortifications. (6) Research and exploit alternative means for excavating fighting positions. (7) Explore the capacity of K-span technology to provide for protective positions.
16. The MAGTF has an inadequate capability to provide electrical support.	**Doctrine:** (1) Conduct a comprehensive study to determine the optimal method to adequately control and maintain MEP generators within the MAGTF. (2) Republish MCO 11210... (3) Develop doctrine regarding power generation and distribution for the MAGTF. **Training/Education:** Educate commanders and users on MEP support capabilities and limitations, and the need to continuously identify their MEP requirements. **Equipment:** (1) Determine current and future MEP generator requirements based on equipment and operational requirements and procure new generators of the appropriate type. (2) Develop automated program to compute electrical requirements. (3) Research and explore alternate power generation and distribution technology. (4) Conduct a study to determine the MAGTF's electrical power generation and distribution requirements. (5) Increase fielding of MEPDIS cables in 5 kw distribution.
17. The integration of the NCF into the MAGTF needs to be improved.	**Doctrine:** Develop joint doctrine delineating all aspects of operational control and integration of the NCF by the MAGTF. **Organization:** Begin a cross-assignment program in which NCF officers and Marine Engineer officers are assigned to billets in each other's organization. **Training/Education:** (1) Institutionalize formal training between the MAGTF and the NCF. (2) Educate officers at all levels on the proper employment of and capabilities offered by Naval Construction Forces. **Equipment:** (1) Evaluate types of equipment which could be common between the NCF and the Marine Corps without sacrificing the unique capabilities of either. (2) Develop a logistics supply support plan which supports the NCF.
18. The MAGTF has an inadequate capability to provide engineer related intelligence.	**Doctrine:** (1) Include critical engineering requirements as part of the EEIs. (2) Develop a more thorough and expeditious dissemination process/system to provide engineer intelligence down to the using units. (3) Update the Navy regional *Construction Capabilities and Resources Reports.* **Organization:** Ensure officer/SNCO intelligence billets are filled within engineer battalions. **Training/Education:** (1) Provide reconnaissance units with specific training on the collection of engineer data. (2) Educate Marines in the aspects of nation building intelligence. (3) Educate personnel in the specific engineer intelligence requirements. (4) Educate logistic, intelligence and engineer officers on the availability of existing logistic intelligence databases. (5) Provide intelligence cycle and EEI training to engineer officers and SNCOs. **Equipment:** Procure an automated system for the dissemination of intelligence down to the individual engineer battalions/squadrons. One possible solution may be the fielding of IAS to those units.
19. The MAGTF lacks the capability to conduct land management in a contingency area of responsibility (AOR).	**Doctrine:** Develop doctrine for preparing land management plans to support MAGTF operations in contingency areas of responsibility. **Training/Education:** Include instruction on land management issues and requirements in programs of instruction at Amphibious Warfare School, Command and Staff and Advanced Engineer School, and Top Level Schools. **Equipment:** Procure automated hardware equipment and software programs that will expedite the plotting, inventory and management of land and facility management programs.

Table 7-1. Prioritized MA-26 Deficiencies With Associated Recommendations and Opportunities

Deficiency by Priority	Recommendation
20. The MAGTF's capability to conduct nuclear, biological and chemical (NBC) decontamination is inadequate.	**Doctrine:** Develop detailed doctrine that delineates responsibilities and procedures for area decontamination. **Training/Education:** Ensure M17 operators are formally trained in the maintenance and repair of the M17 decon apparatus. **Equipment:** Product improve the M17 so that it can operate with multiple fuels.
21. The MAGTF's utilization of explosive ordnance disposal (EOD) support is ineffective.	**Doctrine:** (1) Develop a joint publication explaining how each Service organizes its EOD and how they can communicate with one another in a joint environment. (2) Develop a Tri-FMF SOP to standardize EOD operations between the MAGTFs; this should include employment of EOD on MEU (SOC) deployments. **Organization:** Establish an EOD billet on the MEF staff to be filled by a field grade officer or CWO-5. **Training/Education:** (1) Implement standardized predeployment training consistently across the commands. (2) Develop educational materials for commanders regarding EOD capabilities and how they can be requested.
22. The MAGTF has an inadequate capability to provide laundry support.	**Training/Education:** Incorporate tactical laundry support in field training exercises. **Equipment:** (1) Conduct a study to determine the appropriate quantity of laundry units required to support the MAGTF. (2) Procure the appropriate numbers of laundry units to provide the required capability.
Opportunities	
1. Use robotic systems in MAGTF operations to minimize hazards to personnel.	
2. Use host nation support to preserve the MAGTF's warfighting equipment and supplies for combat operations.	
3. Explore the development of terrain visualization systems.	

7.2 CONCLUSIONS

The engineering mission area (MA-26) is a broad look at all the MA-26 functions in various scenarios and across the Marine Corps operational concepts. This MAA is a qualitative investigation intended to comprehensively assess the entire MA-26. The analysis addresses the capabilities required to perform mobility, countermobility, survivability, and general engineering functions in support of the MAGTF.

The Marine Corps' ability to provide engineer support of MAGTF operations can be characterized by the results of this MAA as *capable, not to standard.* This conclusion is based on an analysis of the results of the Capabilities Review Seminar and the MA-26 Assessment Conference. The results of this analysis found that the Marine Corps can either perform now—or in FY 2005 will be able to perform—48 of the 73 validated tasks at (or above) the standard established during the Task Validation Seminar. The Marine Corps was assessed as being *capable, not to standard* in 1995 and 2005 for 25 tasks.

As indicated above, using the results of the Capabilities Review Seminar and the MA-26 Assessment Conference, the deficiency review and analysis process culminated with the validation of 22 deficiencies and 3 opportunities. The impact of each deficiency on MA-26 was computed and the final results of applying the methodology, along with raw scores provided by participants, are located in Appendix E. The assessment concluded that training/education and equipment lie at the root of the majority of deficiencies that are currently preventing or impairing the ability of Marine Corps units in performing tasks associated with engineering.